

## ABSTRACT

*Senna obtusifolia* (L) H.S. Irwin and Barneby of family Leguminosae is a wild annual tropical weed, growing in various edaphoclimatic conditions in India with significant medicinal properties in Ayurveda, folklore, ethnomedicine and modern medicinal properties due to the presence of various biochemical secondary metabolites like anthraquinones, sennosides, sterols, anthrones, xanthenes, aglycones, and polyketides. This study focused on intraspecific phenetic analyses of *S. obtusifolia* from twenty different provenances of India for prospecting greater availability of a natural bioactive secondary metabolite, rhein, having a broad array of medicinal properties. Rhein was extracted, identified and quantified from the leaf samples of *S. obtusifolia*. The identification and quantification of rhein were analysed by HPLC and ESI-MS studies. The present study pioneered in reporting the presence of rhein in the leaf samples of the species. Provenance variations of the species were studied by considering the phenetic aspects such as, phenology, morphology, and cytology. Subtle amount of variations in different phenological as well as morphometric characters were observed among different provenances. Cytological studies showed minor variations among the provenances of the species with a common diploid set of 26 chromosomes. A considerable amount of variation was observed among the provenances of the species in terms of rhein quantity. Samples from warmer zones showed higher rhein quantity. Genetic variations of the plant from different provenances were also studied through AFLP showing minor intraspecific variations through UPGMA analysis. It was observed that *S. obtusifolia* plants, grown in warmer zones with higher minimum temperature during the growth period, have greater heights in combination serves as the index for the highest rhein producer.